

BAB 5

KESIMPULAN DAN SARAN

5.1 Kesimpulan

1. Senyawa *N'*-(4-hidroksibenziliden)-4-hidroksibenzohidrazida dengan perbandingan mol 1:2 dapat disintesis dengan menggunakan metode iradiasi gelombang mikro.
2. Senyawa *N'*-(4-hidroksibenziliden)-4-hidroksibenzohidrazida memiliki daya antioksidan dengan metode DPPH spektrofotometri dengan nilai IC_{50} sebesar 34,85 ppm

5.2 Saran

Penentuan uji struktur *N'*-(4-hidroksibenziliden)-4-hidroksibenzohida dapat dilengkapi dengan uji NMR untuk lebih meyakinkan. Dilakukan peninjauan ulang untuk pengujian aktivitas antioksidan DPPH secara spektrofotometri.

DAFTAR PUSTAKA

- Armala, M.M., 2009, 'Daya Antioksidan Fraksi Air Ekstrak Herba Kenikir (*Cosmos caudatus* H.B.K) dan profil KLT', *Skripsi*, Sarjana Farmasi, Universitas Islam Indonesia, Yogyakarta.
- Armarego, W.L.F. and Chai, C.L.L., 2009. 'Common Pyshical Techniques in Purification', *Purification of Organic Chemicals*, 6th ed., Elsevier Inc: UK, pp 15.
- Atkins, A. and Carey, F.A., 2007, *Organic Chemistry : A Brief Course*, 3rd ed., McGraw-Hill Companies, Inc., New York.
- Badarinath, A.V., Rao, K.M., Chetty, C.M.S., Ramkanth, V., Rajan, T.V.S., and Gnanaprakash, K., 2010, A Review on In-Vitro Antioxidant Methods: Comparisons, Correlations, and Considerations. *Int. J. Pharmtech Res*, **2(2)**: 1276-1285.
- Bhole, R.P., Borkar, D.D., Bhusari, K.P., and Patil, P. A., 2012, Design An Synthesis of *p*-hydroxybenzohydrazide Derivatives for Their Antimycobacterial Activity, *Journal of the Korean Chemical Society*, **56(2)**: 236-245.
- Buckle, K.A., Edwards, R.A., Fleet, G.H., dan Wooton, M., 1987. *Ilmu Pangan*. Terjemahan: Purnomo, Hari, dan Adiono, UI Press, Jakarta, pp 365.
- Budavari, S. (Ed)., 2001, *The Merck Index* 13th ed, Merc & Co Inc, New York.
- Cadenas, E. and Packer, L., 2002, *Handbook of Antioxidants*, 2nd ed., Marcel Dekker, Inc, New York.
- Emad, A., Shalaby, and Sanaa M., M., Shanab., 2013, Antioxidant Compounds Assays of Determination and Mode of Action, *African Journal of Pharmacy and Pharmacology*, **7(10)**: 532.
- Fennema, O. R., 1996, *Food Chemistry*, 3rd ed. Marcel Dekker, New York.

- Goenawan, K., 2015,'Pengaruh Gugus Hidroksil pada Senyawa 4-hidroksibenzaldehida terhadap Sintesis *N'-(4-hidroksibenziliden)-4-hidroksibenzohidrazida* dengan Iradiasi Gelombang Mikro', *Skripsi*, Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya.
- Gordon, M. H., Pokorny,J., Yanishlieve,N., Gordon, M., 2001, *Antioxidants in Food*, CRC Press, New York.
- Gudasi, K.B., Patil, B.R., Machakanur, S.S., Hunoor,R.S., Badiger, D.S. and Bligh, S. W. A., 2011, Synthesis and Anti-Cancer Evaluation of Cyclotriphosphazene Hydrazone Derivatives, *Der Pharma Chemica*, **3(4)**: 377-388.
- Haley, S., 2009, Methylparaben, In: Rowe, R.C., Schekey, P.J., & Quinn, M. E., (eds.), *Handbook of Pharmaceutical Excipients*, 6th ed, 441-444, London, Pharmaceutical Press and American Pharmacist Association.
- Harmita. 2004. Petunjuk Pelaksanaan Validasi Metode dan Cara Perhitungannya. Departemen Farmasi FMMIPA-UI. *Majalah Ilmu Kefarmasian* **1(3)**: hal.117-135.
- Hart, H., Craine, L. E., and Hart, D. J., 2003, *Kimia Organik, Suatu Kuliah Singkat edisi XI*, terjemahan Achmadi, S.S., Erlangga: Jakarta. 195, 202, 276, 287, 377-378, 392, 396-398.
- Jerry, P.J., Ray, J.B., B., Narayana, M.T., Swammy, and H.S., Yathirajan., 2008, Redetermination of 4-hydroxybenzaldehyde, *Crystallography Journal Online*,**64(1)**:18.
- Juniarti,D., Osmeli, dan Yuhernita, 2009, Kandungan Senyawa Kimia , Uji Toksisitas (*Brine Shrimp Lethality Test*) dan Antioksidan (*1,1-diphenyl-2-picrilhydrazyl*) dari Ekstrak Daun Saga (*Abrus precatorius L*). *Makara Sains*, **13(1)**: 50-54.
- Kalyani, A.G., Jamunarani, R., and Pushparaj, F. J. M., 2014, Research Article Kinetics and Mechanistic Study of Oxidation of 4-Hydroxybenzaldehyde by Alkaline Hexacyanoferrate (III), *International Journal of Recent Scientific Research*, **5(10)**: 1784–1787.

- Keppe, C. O., and Stadler, A., 2005, *Microwave in Organic and Medicinal Chemistry*, WILEY-VCH Verlag GmbH & Co, KGaA, Weinheim.
- Kim, J.K., Noh, J.H., Lee, S., Choi, J.S., Suh, H., Chung, H.Y., Song, Y.O., and Choi, W.C., 2002, The First Total Synthesis of 2,3,6-tribromo-4, 5-dihydroxybenzyl methyl ether (TDB) and Its Antioxidant Activity, *Bull Korean Chem Soc*, **23(5)**: 661-662.
- Kumalaningsih, S. dan Suprayogi, 2006, *Tamarillo (Terung Belanda)*, Surabaya: Trubus Agrisarana.
- Lebeau, J., Furman, C., Bernier, J.L., Duriez, P., Teissier, E., and Cotellet, N., 2000, Antioxidant Properties of di-tert-butylhydroxylated flavonoids, *Free Radic Biol Med*, **29(9)**: 900-912.
- Manahan, S. E., 2005, *Green Chemistry and the Ten Commandments of Sustainability*, 2nd ed., Chem Char Research, Inc: Columbia, pp 9-10, 16-17.
- Merck and Co, 2001, *The Merck Index*, 13th ed., Merck and Co. Inc, New Jersey: USA. 112, 852, 1090, 1091, 1699
- Merkel, R., Hrádková, I., Filip, V., and Šmidrkal, J., 2010, Antimicrobial and Antioxidant Properties of Phenolic Acids Alkyl Esters, *Czech J Food Sci*, **28(4)**: 275–279.
- Mohrig, J.R., Hammond, C.N., and Schatz, P.F., 2010, *Techniques in Organic Chemistry*, W.H Freeman and Company, New York.
- Molyneux, P., 2004, *The Use of the Stable Free Radical Diphenylpicryl – hydrazyl (DPPH) for Estimating Antioxidant Activity*, *J. Sci. Technol*, **26(2)**: 211 – 219.
- Muchtadi, D., Palupi, N.S., dan Astawan, M., 1993, *Metabolisme Zat Gizi, Sumber, Fungsi, dan Keptuhan bagi Tubuh Manusia*, Jilid II, Jakarta: Pustaka Sinar Harapan.
- Nishizawa, M., Kohno, M., Nishimura, M., Kitagawa, A., and Niwano, Y., 2005, Nonreductive Scavenging of 1,1-Diphenyl-2-picrylhydrazyl (DPPH) by Peroxyradical: A Useful Method for

- Quantitative Analysis of Peroxyradical. *Chem Pharm Bull.* **53(6)**:714-716.
- Notas, G., Koutroubakis, I. E., and Kouroumalis, E. A., 2006, *Oxidants and Antioxidants in Liver Disease*, Nova Science Publishers, Inc: New York, pp. 1-3, 9-13.
- Percival, M., 1998, *Antioxidants, Advanced Nutrition Publication*, Inc, diakses tanggal 13 September 2010, <http://acudoc.com/Antioxidants.PDF>.
- Prakash, A., 2001, Antioxidant Acitivity, *Med Lab Anal Prog.* **19(2)**: 1-6.
- Praptiwi, Dewi, P., dan Harapini, M., 2006, Nilai Peroksida dan Aktivitas Anti Radikal Bebas Diphenyl Picril Hydrazil Hydrate (DPPH) Ekstrak Metanol *Knema laurina*, *Majalah Farmasi Indonesia.* **17(1)**: 32-36.
- Pratimasari, D., 2009, 'Uji Aktivitas Penangkap Radikal Buah *Carica papaya* L. dengan Metode DPPH dan Penetapan Kadar Fenolik serta Flavonoid Totalnya', *Skripsi*, Sarjana Farmasi, Universitas Muhammadiyah, Surakarta.
- Robinson, T., 1983. *The Organic Constituents of Higher Plants Their Chemistry and Interrelationships*, 5th ed., Cordus Press, North Amherst.
- Ravichandran, S., and Karthikeyan, E., 2011, Microwave Synthesis - A Potential Tool for Green Chemistry, *International Journal of ChemTech Research*, **3(1)**: 466-470.
- Rowe, Sheskey, and Quinn., 2009, *Handbook of Pharmaceutical Excipients*, 6thed., Royal Society of Great Britain, USA, pp. 441-445.
- Sadeli, R.A., 2016. 'Uji Aktivitas Antioksidan dengan Metode DPPH (*1,1-diphenyl-2-picrylhydrazyl*) Ekstrak Bromelain Buah Nanas (*Ananas comosus* (L.) Merr)', *Skripsi*, Sarjana Farmasi, Universitas Sanatha Darma, Yogyakarta.

- Schwarz, K., Bertelsen, G., Nissen, L. R., Gardner, P. T., Heinonen, M. I., Hopia, A., Huynh-Ba, T., Lambelet, P., McPhail, D., Skibsted, L.H., Tjiburg, L., 2001, Investigation of Plant Extracts for The Protection of Processed Foods Against Lipid Oxidation. Comparison of Antioxidant Assays Based on Radical Scavenging, Lipid Oxidation and Analysis of The Principal Antioxidant Compounds. *Eur Food Res Technol*, **212**: 319-328.
- Silverstein, R.M., Webster, F.X., and Kiemle, D.J., 1991, *Spectrometric Identification of Organic Compounds*, 7th ed., John Wiley and Sons. Inc, New York.
- Sunarni, T., 2005, Aktivitas Antioksidan Penangkap Radikal Bebas Beberapa Kecambah dari Biji Tanaman Familia Papilionaceae, *Jurnal Farmasi Indonesia*, **2(2)**:53-61.
- Wang, Q., Pan, Y., Wang, J., Peng, Q., Luo, H., and Zheng, J., 2011, Synthesis and biological activities of substituted *N'*-benzoylhydrazones Derivatives, *African Journal of Biotechnology*, **10(78)**:18013-18021.
- Winarsi, W. 2007, *Antioksidan Alami dan Radikal Bebas*, Penerbit Kanisius, Yogyakarta, pp.13-15, 77-81.
- Winarti, S. 2010. *Makanan Fungsional*. Cetakan pertama., Graha Ilmu, Yogyakarta.
- Windono, T., Soedirman, S., Yudawati, U., Ermawati, E., Srielita, dan Erowati, T. I. Uji Peredam Radikal Bebas terhadap *1,1-Diphenyl-2-Picrylhydrazyl* (DPPH) dari Ekstrak Kulit Buah dan Biji Anggur (*Vitis vinifera* L.) Probolinggo Biru dan Bali, *Artocarpus*. **1**: 34-43.